



Chemical Analysis of Sediment and Water Samples near Possum Point

Report to Potomac Riverkeeper

Dr. P.L. deFur, Environmental Stewardship Concepts, LLC

July 24, 2015

This report summarizes the data obtained from sampling water and/or sediment from three locations in the vicinity of Possum Point, Quantico Creek, Virginia. Sampling was conducted on May 6, 2015 by Dean Naujoks, Philip Musegaas and Dr. Peter deFur. Field notes, GPS positions and all records were maintained by and retained by Naujoks and Musegaas.

Water and sediment samples were obtained from three locations, one of which is a reference location close to the center of Quantico Creek. One location did not afford a clean water sample from a discrete flow off land, and thus only sediment was obtained from this location, the first sampling location. All samples were maintained on ice and shipped via commercial shipping in iced coolers with chain of custody forms.

Water:

PPW02 (Possum Point Water Sample 1)

Location: 38 32 45.7548 N, 77 17 13.0632 W

(Surface seep/discharge from Marsh proximate to Pond D culvert/toe drain)

PPW03 (Possum Point Water Sample 2)

Location: 38 32 59.064 N, 77 17 39.0696 W

("right side" culvert draining Beaver Pond)

PPWRef (Possum Point Water Sample reference/control)

Location: 38 32 54.8 N, 77 17 44.5 W

(Quantico Creek)

Sediment:

PPS01 (Possum Point Sediment Sample 1)

Location: 38 32 38.8 N, 77 17 10.5 W

(Pipe outlet near shoreline from Pond C)

PPS02 (Possum Point Sediment Sample 2)

Location: same as PPW02

PPS03 (Possum Point Sediment Sample 3)

Location: Same as PPW03

PPSRef (Possum Point Sediment Sample reference/control)

Location: 38 32 55.1 N, 77 17 44.5 W

(Quantico Creek)

Each sample was a single event and each was analyzed for various chemicals, mostly metals or metalloids, plus some standard measures. Thus, there were not enough samples to perform even descriptive statistics. Each sample was compared with the appropriate reference sample to yield a ratio: value in sample/value in reference. The attached spreadsheets provide the original data reported to Environmental Stewardship Concepts (ESC) and Potomac Riverkeeper (PRK) from the two analytical labs, with the ratios compared to reference values added.

Water:

Three water samples: one reference and two from seeps or runoff; Sample #2 was from a water flow out of a marsh that drained behind an ash pond; Sample #3 was from inside the mouth of a large culvert (approximately 6 feet).

Inspection indicated sample #3 seemed indistinguishable from the reference sample, except selenium and vanadium were elevated four and eight times higher than the reference sample, respectively.

Sample #2, on the other hand, had most chemicals present in concentrations greater than the values in the reference sample.

31 chemicals were measured

Sample #2 had most chemicals elevated over the reference station

Six chemicals were Non Detect in either or both samples

Four chemicals were little different from reference as $0.85 > \text{ratio} < 1.2$

The other 21 metals were 1.7 to 15 times higher than measured at the reference location

The greatest elevation was boron, a known indicator of coal ash at > 15 times higher than the reference sample boron concentration.

Sediment:

Sediment was obtained from all three sampling locations plus the reference location, for a total of four sediment samples. All samples had a high sand content. A total of 14 metals were measured in all four sediment samples. As was the case with water samples, the sediment sample from location #1 seemed indistinguishable from the reference sample. Similar to the water samples, the sediment from location #2 had elevated metal concentrations compared with the reference sample. In fact, all 14 metals were present in concentrations higher than the reference sample, by 2.4 to 16 fold. Selenium concentration was 16 times higher than in the reference sediment sample.

Sample #3 had only three metals at concentrations two times or more greater than reference sample values: selenium was 24.5 times higher, arsenic was three times higher, and aluminum two times higher than reference sample values. Although the arsenic concentration was elevated in one sediment sample at site #3, all arsenic levels were in the range of the arsenic levels in soils in the Mid-Atlantic area.

Summary and Conclusions:

Sampling location #2, an apparent seep from a berm with an ash pond above displayed elevated levels of metals and minerals compared with samples from the reference location near

the center of Quantico Creek. This location seems to have been contaminated with metals and minerals, and the most obvious and logical source is the water running off from the berm area. The presence of boron in water, selenium in sediments is consistent with ash as a source of the metals and minerals.